

lopment of the urinary organs and suprarenal bodies (pp. 350, 351) also leaves much to be desired.

After a chapter on the "Psychology of the Cat," Prof. Mivart devotes one to the different kinds of cats, living and extinct. Of the living species he recognises fifty, forty-eight of which are included in *Felis*, the other two being the two species of Cheetah (*Cynælurus*). We are glad to see that Prof. Mivart does not recognise the various genera *Leo*, *Tigris*, *Uncia*, &c., proposed by the late Dr. Gray, which have been adopted by some recent naturalists. The Ounce (*F. uncia*) is stated (p. 396) to occur near Smyrna; but we believe the sole authority for this is the identification by the late Mr. Blyth, who was followed by Gray, Jerdon, and others, of the *Felis tulliana* of Valenciennes with the true *F. uncia* of the central tablelands of Asia. According to the latest authorities *F. tulliana* is certainly *not* the Ounce, and is, in all probability, only a long-haired and pale-coloured Leopard (*F. pardus*).

Chapter XIII. is devoted to the "Cat's Place in Nature," a consideration of the relationships of the *Felidæ* to other Carnivora, and organic forms generally. In the enumeration of the characters of the three great groups of Fissiped Carnivora, we miss any allusion to their well-marked cerebral differences, clearly pointed out by Prof. Flower, and on which the late Prof. Garrod laid so much stress. "Aard-vark," we may mention, is the Dutch name for the *Orycteropus*, not for *Proteles*, as stated on p. 483. The cat's hexicology (or its relations to its environment) occupies the next chapter, and the concluding one deals with the problems of the origin and pedigree of the animal. In treating of the main zoological regions of the globe (pp. 497-500) it is not clear by what exact criterion Prof. Mivart has been guided in selecting forms representative of those regions. Neither mules (why introduce such artificial products as hybrids at all in such a connection?) nor chameleons can be considered as specially characteristic of the "Palæ-arctic" region, nor should we have noted the absence of "true grouse" or the presence of "the mocking-bird" as peculiarities of the "Ne-arctic" one. Why, too, call *Hyomoschus* the "aquatic musk-deer" (p. 498), when on p. 467 Prof. Mivart has correctly characterised the chevrotains as "very small animals, commonly called *in error* musk-deer"?

The book, we must add, is on the whole got up in very good style, both as regards type, paper, and illustrations. Of the latter there are over 200 woodcuts, many of them original, and including a nice series of figures of some of the less known species of *Felidæ*, as well as of skulls of some of the more remarkable North American extinct *Æluroidæ*. It is to be regretted, however, that the volume should be disfigured by numerous misprints, most of them of well-known names. Thus we have *Potama gale* and *Potomogale*, *Arctitis*, *Mustilidæ*, *Amphinama*, "Horned-senamer" (for -screamer), *Teniada*, *Gregorinidæ*, &c. Fort Bridger, a locality in Wyoming Territory, well known for its vertebrate remains, appears as Fort Bridges (p. 512) and also as "Fire Bridge" (p. 506)! Prof. Mivart, too, is not consistent in his spelling; thus we have Bali and Bally, and *Ailurus*, *Ailuropus*, &c., succeeded almost immediately by *Æluroidæ*, *Pseudælorus*, &c. Lastly, it is a pity that the author does not always give his refer-

ences in full, or even get the titles of the journals quoted correctly: thus on p. 331 we notice the "Quarterly Journal of Microscopic Science, and Schäfer's Proceedings of the Royal Society" (*sic*). W. A. FORBES

### CRYSTALLOGRAPHY

*Rammelsberg's Handbuch der Krystallographisch-Physikalischen Chemie*. Vol. I. (Leipzig: W. Engelmann, 1881.)

THIS volume may to a certain extent be regarded as the first part of a new edition of Prof. Rammelsberg's two previous works on the same branch of science ("Handbuch d. Kryst.-Chemie, 1855; and "Die Neuesten Forschungen im Gebiete der Kryst.-Chemie," 1857). The development of its plan and the wealth of material entitle it, however, to rank as a new work, and has necessitated its division into two parts, of which the present one deals with the elements and inorganic compounds. Of late years much work has been done in the investigation of the physical properties of the artificial substances obtained in our chemical laboratories, the account of which is dispersed through the various scientific periodicals often in such a way as to render it all but impossible to find out whether any investigations have been made of the physical properties of a particular substance. The present work will therefore be highly welcome to both chemists and physicists who are interested in this their common province, and as a book of ready and easy reference will be a great boon to all researchers. The aim of the book is to give in as condensed a form as possible all the physical properties of artificial substances as far as they have been determined, in addition to the crystallographic characters which are often the only ones known. Thus the optical constants, the dilatation under change of temperature as determined by Fizeau, the electrical, magnetic, and other properties of each substance are given wherever known. In fact it aims at doing for minerals in Miller's and Des Cloizeaux's "Treatises on Mineralogy." In addition the references to the original memoirs on each property are placed directly after the account of this property. Prof. Rammelsberg's reputation for the thoroughness of his work has been so long established that it seems almost impertinent to praise the excellent way in which he has here carried out his intention. He has produced a book which will not only be in every chemist's and physicist's library, but one which will be continually consulted by them. After dipping into the book in numerous places only one substance has been met with which seems inadequately treated, and this is antimony iodide, than which few substances are more interesting to the crystallographer. The account of the modifications and their relations is in this case scanty and imperfect, and the reference to Prof. Cooke's elegant research on them is wanting in precision.

Prof. Rammelsberg adopts the Weissian system of notation in his Crystallography, but this not in its entirety, as he uses sub-multiple—and not multiple—indices, as was done by Weiss. In the last paragraph of his introduction he states his opinion that the Weissian system is superior to those both of Naumann and of Miller, and he ends by declaring that crystallography would have been

much more studied by chemists had crystallographers avoided following the two latter distinguished men. It is difficult to understand such a view for, as far as descriptive crystallography is concerned, the Weissian and Millerian notations are practically identical except in the rhombohedral system, where different axial systems are adopted. The advantages of Miller's trigonometrical methods of calculation are acknowledged by many who, through long familiarity, invariably use the geometrical methods, and no one who is acquainted with both can hesitate as to the one he will employ.

The work is a fresh monument of Prof. Rammelsberg's indefatigable industry and skill in arranging and condensing a vast amount of material, and is a worthy addition to the long list of works on chemistry and crystallography with which science has been enriched by him.

### OUR BOOK SHELF

*The Encyclopædic Dictionary: A New and Original Work of Reference to all the Words in the English Language.* By Robert Hunter, M.A., F.G.S. Illustrations. Vol. I.: A—Cab. (London: Cassell, Petter, and Galpin. No date.)

*The Imperial Dictionary of the English Language: A complete Encyclopædic Lexicon, Literary, Scientific, and Technological.* By John Ogilvie, LL.D. New Edition, carefully revised and greatly augmented. Edited by Charles Annandale, M.A. 3000 Engravings. Vol. I.: A—Depascent. (London: Blackie and Son., 1882.)

NO better evidence could be adduced of the extent to which science has permeated modern life and literature than the prominence given to scientific terms in these two dictionaries. Words which a few years ago were confined only to technical vocabularies and were known only by specialists, are in these reference-books for general use found side by side with the vocabularies of Chaucer, Shakespeare, Tennyson, and Dickens. The many illustrations, too, are to a large extent derived from science, while the great advances recently made by a scientific study of language are shown in the etymologies. Mr. Hunter's undertaking is one of great magnitude, a combination of the dictionary and encyclopædia, an account of things as well as words. To judge from the first volume, it is likely to turn out a work of great practical utility. The vocabulary is as complete as could be desired, and the treatment of the various terms full, concise, accurate, and methodical. Mr. Hunter includes terms in the oldest English, and the scientific vocabulary is so full that it will be found of service even to specialists. The special terminology of botany, zoology, and chemistry is included, and, so far as we have tested, all those terms which have originated in the recent rapid advances of science. The numerous illustrations are carefully and nicely executed, and the etymologies give evidence of the study of the best authorities; though sufficient care is not always taken to distinguish between cognates and derivatives. Mr. Hunter has been "assisted in special departments by various eminent authorities"; indeed he could never have adequately carried out his undertaking without such assistance. We wonder, however, who his botanical assistant is. Under Botany we have a short history of the science, in which its classifications by various authorities are given; in Modern Botany, for example, we have first Lindley, then Thomé, and finally—"Robert Brown, jun."!

Ogilvie's Imperial Dictionary has held its place for about forty years, in spite of certain failings, especially in its etymology. It quite deserved the great reputation

and popularity it had for so long, for it was really the most thorough and complete and practically useful dictionary in the language. It really, like Mr. Hunter's book, was a combination of dictionary and encyclopædia. It, however, greatly needed to be brought up to date, and this is what Mr. Annandale has attempted to do in the new edition, and the attempt has been successful. It is more concise than Mr. Hunter's book, both in vocabulary and definition, but on this very account may be preferred by many. It ranges over the whole of English and Scotch literature, and its scientific department is as full as the most exacting reader could require. The definitions are given with care and accuracy; the etymology is up to the latest research, and is concise and clear; the illustrative quotations show extensive reading, and the illustrations are thoroughly intelligible and neat. In its new form the "Imperial" is likely to meet with as wide acceptance as it did when originally published. Both dictionaries are excellently printed.

*First Steps to a New Selenography; in which it will be recognised that the Moon was once an Inhabited World.* By John Jones. (Dundee: J. Leng and Co., 1881.)

THE title of this little book is hardly in accordance with its contents. For it is not *selenography*—the description of the features of our satellite—but *selenology*, the theory of the mode of their formation, that the author has taken in hand; and the inhabitants to whom he proposes to introduce us will be found to be by no means, as we might have expected, "men in the moon," but creatures of one of the lowest types of existence. We will not, however, quarrel with this. But we are obliged to add that the writer has attacked his subject in rather a peculiar way. Having come into possession of a good telescope, he has satisfied himself, from three nights' inspection of the Moon, that all former observers are in the dark, and that the real cause of her crateriform aspect is the building up of *atolls* of coral reef in oceans of volcanic mud, while the mysterious brilliant streaks are due to the friction and polishing of a glacial period. Various theories, as our readers may be aware, have been proposed to account for the wonderful aspect which our satellite presents in a telescope, and which is not unencumbered with difficulty; and the discussion, which has been going on for half a century, has by no means reached an uncontroverted solution. Nor can it be any disadvantage to the cause of truth that it should be thoroughly ventilated, and looked at from every point of view. But we must be forgiven for doubting whether the publication before us will advance the inquiry. We are loth to bear hard on any ingenious speculator, but we cannot persuade ourselves that the "crater-craze," be it right or wrong, will be "exploded" by the observations of three nights. And as to the possibility, alleged in the "Epilogue," that a meteor, "colliding with the extremities of projecting pinnacles of the lunar structures," might demonstrate the theory to our senses by transferring a fragment of coral reef to the surface of our globe, the author we hope will excuse us for preferring to wait for the messenger before we acquiesce in the theory.

*The First Book of Knowledge.* By Fredk. Guthrie, F.R.S. (London: Marcus Ward and Co., 1881.)

FROM the style of this little book we should judge that it is intended for the use of School Board teachers in giving Object Lessons. It gives in simple language an idea of the nature of common objects, and also of the mode of their composition. Of course from a man of such well-known ability as Prof. Guthrie we may be quite sure that the book will be perfectly accurate and thoroughly good so far as its subject-matter is concerned. The manner, however, in which the knowledge to be communicated is arranged is by no means to be unreservedly praised. In endeavouring to be simple Prof. Guthrie has adopted a